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Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Antibiotic Therapy

This essay outlines the clinical application of antibiotic agents commercially available at present.

Penicillin

Penicillin remains the physician's chief weapon against a variety of microorganisms, most of which are Gram-positive. Of the many naturally occurring penicillins, penicillin G, penicillin O, and penicillin V are the fractions which have been produced commercially.

Aqueous crystalline penicillin G is employed when rapid effect or high concentrations of the agent in the serum are desirable. Procaine penicillin G is used when a longer acting preparation is called for. In the presence of pneumococcic pneumonia, for instance, it is administered intramuscularly once or twice daily in amounts of 300,000 to 1 million units. Benzathine penicillin G, in amounts of 600,000 to 1.2 million units given intramuscularly, has been recommended for the long-term prophylaxis of rheumatic fever or glomerulonephritis in which reinfection by beta-hemolytic streptococci is highly undesirable.

When penicillin is to be employed for a person known to have allergy to penicillin G, the hypoallergenic penicillin O has been recommended, but the consensus is that use of this particular compound does not assure that untoward reactions will not occur.

The quest for an orally effective preparation of penicillin culminated in the discovery and clinical application of phenoxymethyl penicillin, more commonly referred to as "penicillin V." This preparation is readily absorbed into the serum when given orally, and concentrations in the blood in excess of those that follow similar oral doses of penicillin G are obtained.

Despite the present availability of many newer antibiotic agents, penicillin continues to have a wide range of usefulness. Penicillin currently is

most commonly employed against pneumococcic, gonococcic, streptococcic, meningococcic, and syphilitic infections.

The use of probenecid (Benemid) may increase the content of penicillin in the blood, especially if the original content is low, but probenecid may also provoke gastrointestinal irritation.

The indiscriminate use of penicillin often has been decried and hardly needs reemphasis. In a recent survey dealing with untoward reactions to antibiotic agents, it was found that penicillin was responsible for the greatest number. It is worthwhile to mention that, in anticipating such reactions, a history of adverse reactions to penicillin in the past or the report that the patient previously exhibited other evidence of allergy—particularly asthma—is more important than skin testing.

Streptomycin

With the exception of the tubercle bacillus, many organisms that are sensitive to the action of streptomycin also are sensitive to the tetracyclines. These latter drugs do not produce the toxic reactions that may follow the use of streptomycin, and organisms usually do not acquire resistance to tetracyclines as rapidly as to streptomycin. Therefore, in mild infections caused by these organisms, tetracycline often is the drug of choice. However, in recent years, it has been concluded by some investigators that streptomycin, when used in combination with other antibiotic agents, may produce increased killing of certain organisms; consequently, it is often used together with the tetracyclines and other antibiotics.

Streptomycin-tetracycline therapy is currently held by many to be the treatment of choice against brucellosis. Although tularemia is not a common disease, it is one of the few in which streptomycin seemingly can be employed alone with excellent results. Use of the agent against tuberculosis in combination with other antituberculous agents hardly requires reiteration. Streptomycin also is used in combination with the tetracyclines against serious infections caused by Gram-negative enteric bacilli.

Dowling noted that streptomycin may be less likely to cause damage to the auditory nerve than will dihydrostreptomycin or a combination of the two substances given in equal parts.

Bacitracin

Bacitracin is primarily antagonistic to Gram-positive organisms, including most strains of *Staphylococcus aureus*. It has little activity against Gram-negative bacteria except those of the genera *Hemophilus* and *Neisseria*. An *in vitro* synergistic effect of this agent in conjunction with penicillin was noted by Eagle and Fleishman, and consequently these agents occasionally are combined in the treatment of severe infections caused by susceptible organisms. Bacitracin also has been given in combination with other agents, such as chloramphenicol, with good results against serious staphylococcic

infections in which use of the latter agent alone has not been so effective. Bacitracin has been employed safely in the form of an aerosol mist in pulmonary diseases. The oral administration of bacitracin does not result in detectable concentrations in the serum and, consequently, the agent thus administered has been found useful against staphylococcic enterocolitis.

Polymyxin B

In addition to nephrotoxicity, such manifestations as acroparesthesia, cerebellar ataxia, and pain at the site of injection have been observed after parenteral use of polymyxin B. Such disturbances may appear within 48 hours after administration of relatively small doses of the drug, but usually they subside within a day or two after administration has been discontinued.

It is apparent that polymyxin B is to be reserved for those infections that do not respond to other agents. The agent is active against Gram-negative bacteria of the coliaerogenes group and some strains of *Shigella* and *Salmonella*, but it is employed mainly against serious infections caused by *Pseudomonas* organisms.

Neomycin

Neomycin is active against both Gram-positive and Gram-negative bacteria, but when it is given parenterally it is nephrotoxic and may produce fever and various symptoms referable to the nervous system, including those of damage to the eighth cranial nerve. When administered orally, neomycin is not absorbed from the gastrointestinal tract and, thus, it has been found useful as an intestinal antiseptic agent. It should be used systemically only when safer antibiotic agents will not suffice.

During discussion of the preceding antibiotic agents, some untoward effects were mentioned. It may be worthwhile to remark that damage to the eighth cranial nerve is observed after the administration of streptomycin, dihydrostreptomycin, and neomycin. Such toxicity may also follow the use of kanamycin, an antibiotic agent also discussed in this review.

Tetracyclines

The introduction of tetracycline hydrochloride into clinical medicine has largely supplanted use of the older antibiotics, oxytetracycline (Terramycin) and chlortetracycline (Aureomycin). The compounding of tetracyclines with such substances as phosphate, citric acid, or glucosamine has been said to increase concentrations of the antibiotic agent in the blood, but such data are not definitive at this time.

After the oral administration of the tetracycline compounds, nausea, vomiting and, sometimes, looseness of the stools may be encountered. The incidence of nausea and vomiting after use of the tetracyclines is reduced if the agent in question is given with cold pasteurized milk or with sodium bicarbonate or calcium carbonate in amounts of 5 grains with each 250 mg. of the antibiotic agent.

The tetracyclines are extremely useful against serious Gram-negative bacillary infections, such as bacteremia in which they are often used in conjunction with a streptomycin preparation. Such a combination of antibiotics may have application against postoperative infections caused by Gram-negative organisms of enteric origin. The tetracyclines are employed in the treatment of other conditions, such as brucellosis, actinomycosis, amebiasis, rickettsial disease, and the less common venereal diseases, lymphopathia venereum, granuloma inguinale, and chancroid. The tetracyclines also are used against mild infections of the urinary tract caused by susceptible Gram-negative bacilli of enteric origin, such as *coliaerogenes* and *Proteus* organisms.

Chloramphenicol

Chloramphenicol is an excellent antibiotic agent with a wide range of activity against Gram-positive and Gram-negative organisms. It remains the agent of choice against typhoid fever. Chloramphenicol also can be employed in certain infections caused by *Staphylococcus aureus* which are resistant to other antibiotics. The usual oral dose of chloramphenicol is 500 mg. given every 4 hours. Preparations designed for parenteral use are available.

Because use of this agent has been noted to coincide with depression of the bone marrow, chloramphenicol should not be administered indiscriminately.

Erythromycin

Experiences with erythromycin at the Mayo Clinic have indicated that it is effective against many staphylococci, other Gram-positive bacteria, and some strains of *Hemophilus*. However, more than one-fourth of the staphylococci encountered in hospitals associated with the Mayo Clinic are resistant to erythromycin—a fact that has lessened applicability of the agent in this regard.

Erythromycin is of considerable use in patients who are allergic to penicillin and who have infections susceptible to erythromycin.

Novobiocin

Because a major problem in the treatment of infectious disease is the management of infections caused by the antibiotic-resistant *Staphylococcus aureus*, the introduction of novobiocin is welcome. Novobiocin is about as effective against staphylococci as is erythromycin and displays no cross-resistance with older antibiotic agents. It can be given orally and even though there seems to be considerable individual variation in absorption, adequate quantities of the agent in the serum are obtained.

Ristocetin

Ristocetin is a new antibiotic agent which is effective against most Gram-positive cocci, but probably is best reserved for serious

staphylococcic infections which are resistant to the more commonly employed antibiotic drugs. The agent can be administered only intravenously.

Romansky and co-workers have described ristocetin as having possible value in the treatment of endocarditis caused by *Staphylococcus aureus*, *Streptococcus mitis*, and *Streptococcus faecalis*; additional investigation in this regard seems warranted. Ristocetin—like bacitracin and neomycin—is not absorbed to any appreciable extent when it is introduced by the oral route and, like these agents, it may have application in the treatment of staphylococcic enterocolitis if the patient's condition allows enteric therapy.

Triacetyloleandomycin

Triacetyloleandomycin is a new chemical derivative of the antibiotic, oleandomycin, which has been prepared by the acetylation of three hydroxyl groups in the parent molecule. The scope of the therapeutic effectiveness of triacetyloleandomycin parallels that of erythromycin, and the major indication for its use is infection caused by some strains of staphylococci resistant to other antibiotic agents.

Amphotericin B

Amphotericin B is a relatively new antibiotic agent that gives evidence of usefulness as an effective antifungal drug. There is only minimal absorption of amphotericin B after it has been given orally and, therefore, it is usually administered parenterally for systemic infections. The authors have found amphotericin B, given for a period of 6 weeks, to be effective against cryptococcosis; preliminary data are encouraging in respect to use of the agent against other fungal diseases.

Kanamycin

Kanamycin is a new antibiotic agent which must be administered parenterally against systemic infections. Toxic effects of this drug include impaired renal function, damage to the eighth cranial nerve, acroparesthesia, pain on injection, and dermal reactions.

Although little experience with the agent against clinical infections has been accumulated, kanamycin appears to be active against many strains of staphylococci, some strains of coliform bacilli, and selected organisms of the genera *Salmonella* and *Shigella*. The drug appears to be relatively inactive against the majority of strains of streptococci, diplococci, and species of *Bacteroides*, *Proteus*, and *Pseudomonas*. In vitro resistance of staphylococci and *Escherichia coli* to the action of kanamycin has been induced. There is apparently complete cross-resistance between organisms able to resist neomycin and the new agent; some evidence suggests partial cross-resistance between organisms that can resist streptomycin and the new agent. If the latter finding is corroborated, the number of strains of staphylococci that are resistant to kanamycin may be higher than was initially estimated.

Staphylococcic Infections

Recently, much thought and discussion have been devoted to infections caused by *Staphylococcus aureus*, particularly hospital-related infections. When a program for the management of staphylococcic infections is planned, it should be realized that adherence to principles of asepsis, isolation of infected patients, and elimination of carriers of staphylococci are of primary importance. Host factors frequently have become altered to such a degree as to permit development of such infections. Underlying diseases, such as diabetes mellitus, agranulocytosis, hypogammaglobulinemia, leukemia, and Cushing's syndrome, as well as the use of such agents or procedures as steroids, nitrogen mustard, roentgen rays, antibiotics, and surgery may encourage invasion by staphylococci. Unfortunately, no single antibiotic agent will influence favorably all systemic staphylococcic infections and reliance must be placed on results of in vitro tests of sensitivity of the organisms to different drugs and on clinical judgment for the rational management of an individual infection.

Penicillin is the drug of choice against staphylococcic infections if the organisms are sensitive to its action. However, many infections caused by hospital-acquired staphylococci—for example, those of the so-called 80/81 bacteriophage types—are insensitive to penicillin so that the administration of penicillin for these infections probably is useless.

Erythromycin is resorted to if the staphylococci are sensitive to it but are resistant to penicillin, or if the patient is allergic to penicillin. However, in the presence of certain chronic infections, such as endocarditis, erythromycin alone will not suffice.

When infections are caused by erythromycin-resistant strains of staphylococci, triacetyloleandomycin may be useful because there is a 70% chance that the organisms may be sensitive to its action. The use of triacetyloleandomycin against strains sensitive to its action, but resistant to that of erythromycin, may obviate the need for frequent use of novobiocin. This means that novobiocin can be held in reserve.

Clinical experience with novobiocin in staphylococcic infections has been favorable, not only against infections of the skeletal system and soft tissues, but also against more serious states, such as bacteremia, pneumonia, and meningitis. However, in the presence of staphylococcic endocarditis, what was said about erythromycin is also true about triacetyloleandomycin and novobiocin: neither would appear to be the agent of choice, used alone.

If penicillin, erythromycin, triacetyloleandomycin, or novobiocin cannot be used in the treatment of systemic staphylococcic infections, recourse must be had to agents of less applicability. Because the use of chloramphenicol has been associated with the development of blood dyscrasias, it seems best to limit the application of this agent to nonendocardial staphylococcic infections in which the infecting strains are sensitive to its action, but resistant to the previously discussed antibiotic agents.

Ristocetin and kanamycin have been reported as occasionally causing serious side effects and, therefore, these antibiotics probably should be reserved for serious staphylococcic infections, such as bacteremia and endocarditis against which no less toxic antibiotic will suffice. Ristocetin and kanamycin can be administered only parenterally in the treatment of systemic infections.

Bacitracin and neomycin have been used successfully in the treatment of various types of staphylococcic infections, but the usefulness of these agents has been limited by their toxicity and the need for intramuscular administration.

Streptomycin, because of the rapidity with which staphylococci may develop resistance to its action, and polymyxin B which has only slight—if any—antistaphylococcic action, usually are not considered in the therapy of infections caused by the organisms in question.

Preliminary experiences in the treatment of serious staphylococcic infections with agents thus far limited to investigational use, such as vancomycin, have been encouraging. Vancomycin is another potent antibiotic that has been very effective in certain antistaphylococcal infections. It has some toxic potentialities.

It is true that, because of the emergence of strains of staphylococci resistant to several antibiotic agents, the practitioner must rely heavily on the results of in vitro tests of sensitivity in order to treat such infections rationally. Still, time is not always sufficient to allow such investigation. When treatment of systemic infections must be started before the results of such tests are available, it is recommended that an antibiotic agent be used to which the staphylococci in the particular institution or community concerned most likely are sensitive. These agents would be novobiocin, chloramphenicol, ristocetin, and so on. (Schirger, A., Martin, W. J., Nichols, D. R., Antibiotic Therapy - Clinical Application of Available Agents: GP, XIX: 102-107, February 1959)

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Early Diagnosis of Chronic Simple Glaucoma

Glaucoma designates eye disease characterized by increased intraocular pressure. It is of extreme importance because of its relatively high incidence, because glaucomatous visual loss is permanent, and because proper early therapy prevents visual damage. Adequate supervision of glaucoma requires a medical specialist.

Glaucoma is present in about 2% of persons over 40 years of age—an incidence similar to that of diabetes. It is estimated that 800,000 cases of undiscovered glaucoma exist in the United States today and that 12% of the nation's blindness is due to glaucoma.

Chronic simple glaucoma is by far the most common type of the disease. The condition has aptly been termed "a thief in the night" because without warning it gradually and irreversibly destroys vision. It is usually painless or, at most, causes slight occasional aching of the eyes. Complete blindness can occur without any acute attack. The elevated intraocular pressure causes slow nutritional damage, producing the characteristic arcuate scotomata which are unrecognized until they finally encroach on central vision. In its advanced states, the disease does not respond well to medical or surgical therapy and often progresses to blindness, whereas, in the early stages it usually may be controlled with miotic therapy.

Glaucoma should be suspected under the following circumstances:

1. If the patient is over 40 years of age.
2. If there is a family history of serious visual loss (glaucoma is hereditary).
3. If the corneal diameter is 10 mm. or less (average normal is 12 mm.).
4. If the anterior chamber is shallow and the iris seems to bow toward the cornea.
5. If the frequent unsatisfactory changing of glasses suggests the possibility of disease.
6. If unexplained aching is present about the eyes.

The coexistence of age over 40 years and any other one of the factors listed should strongly suggest the desirability of referral to an ophthalmologist. Tonometric measurement of intraocular tension is required for accurate diagnosis. This is done routinely by most ophthalmologists in the examination of elderly patients. The intraocular pressure in chronic simple glaucoma usually is not elevated enough to permit detection by finger tension. Finger tension is easily confused with compressibility of orbital tissues, and even when done by an expert may be in error by as much as 10 mm. of mercury.

Chronic simple glaucoma is caused by gradually increasing resistance to the outflow of aqueous humor due to aging processes in the angle of the anterior chamber. The anatomic predisposition to glaucoma is genetically transmitted and it is, therefore, most desirable to inquire about familial blindness in the routine family history.

Although certain anatomic features markedly predispose their possessors to glaucoma, its occurrence is not inevitable. It must be stressed that the great majority of patients with chronic simple glaucoma do not show grossly visible changes of any sort. Nevertheless, it is well known that eyes with reduced corneal diameters or shallow anterior chambers have a great predisposition toward glaucoma.

Sometimes, it is possible to make a relatively early diagnosis of glaucoma through suspicion of vague symptoms. Patients who have had two or three pairs of unsatisfactory glasses within a short time may have eye-disease

rather than refractive error. (Psychoneurosis is, unfortunately, another cause for such complaints. Many glaucoma patients are tense, nervous individuals and may at first be misdiagnosed as having a functional disorder.) Another group of patients may have vague ocular aching or discomfort, sometimes referred to the occipital region. Glaucoma should be considered as a possible cause of such unexplained discomfort in the older patient.

With great frequency, both ocular and systemic diseases manifest themselves through visual disturbances and eye fatigue. The patient has no way to differentiate these symptoms from those of refractive error. Should he seek aid from a nonmedical refractionist, diagnosis of the true nature of his difficulty and proper treatment are often considerably delayed. In addition, the patient often loses the price of an unnecessary pair of spectacles.

If glaucoma were a disease which could not be modified by treatment, early diagnosis would be of little avail. The great majority of early cases do respond well to proper use of miotic therapy. By contrast, advanced cases often fail to be controlled by medical or surgical means. (Havener, W.H., Early Diagnosis of Chronic Simple Glaucoma: Postgrad. Med., 25: 148-151, February 1959)

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Eye Injuries in Children

This article discusses the problems involved in eye injuries in children, gives briefly the generally accepted methods of management, and emphasizes that the prevention of ocular injury is much more profitable than the treatment.

When compared to all types of injuries sustained by children, eye injuries are not common. However, the fact that eye injuries are commoner in children than in the general population was shown by a recent study which revealed that children up to 9 years of age account for over 20% of all serious eye injuries. Because accidents of various kinds cause about 50% of all blindness in one eye and about 20% of all blindness in both eyes, proper and early treatment and prevention of injuries are extremely important. Because of the delicacy and peculiarities of ocular tissues, an injury that would be insignificant elsewhere is a serious one in the eye and may result in the immediate or eventual total loss of vision in one or both eyes.

Sharp objects, blows, falls, and foreign bodies produce the greatest number of the serious eye injuries (82.2% of all major injuries in one analysis). However, BB shot, fireworks, firearms, explosions (dynamite caps, et cetera), chemical burns, and thermal burns are also responsible for many injuries to the eyes.

Christmas toys are significant as a source of severe eye injuries in children. It is surprising how many seemingly harmless toys represent the instrument for severe eye injuries. The most obviously dangerous ones (BB guns, bows and arrows, and darts) are responsible for the greatest number of severe injuries from toys, but sharp-edged metal or plastic toys also make a significant contribution. A harmless rubber-tipped bow and arrow set becomes a dangerous weapon when sticks and reeds are converted to arrows in a friendly game of "cowboys and Indians."

Injuries to the eyes may be the result of (1) toxic chemical agents, (2) thermal agents, (3) mechanical agents, and (4) certain radiations. Of the toxic chemicals which are likely to be involved in eye injuries in children, household ammonia, lye, and potassium hydroxide are the most damaging agents.

In contrast to acid burns, which can usually be evaluated immediately, alkali burns tend to be progressive and may be misleading. Evaluation and treatment by an ophthalmologist are usually necessary, but should not take precedence over the sine qua non of immediate and thorough irrigation. A new drug, edathamil (Versene) may diminish corneal opacities in some lime burns by removing calcium deposits from the cornea. Prompt and prolonged irrigation of all toxic chemicals from the eye should be done before medical attention is sought or specific treatment begun.

Hot liquids and flaming clothing or kerosene often injure the eyes when the face and upper half of the body are involved in extensive burns, and all too frequently, children are the victims of such accidents. Attention to the eyes may be of secondary consideration owing to the pressing need for life-saving measures. In such instances, Butler has had good results with the use of atropine and antibiotic ointment instillations, and if the eyes had to be incorporated in an over-all head and face bandage, he did not dress them again for as long as a week or 10 days. Severe burns should have the attention of an ophthalmologist, but if one is not available at the time of initial care, the above method has proven safe and satisfactory.

Mechanical agents or foreign bodies may injure the lids and globe in various ways, causing abrasions, lacerations, contusions, and penetrating injuries. The importance of tetanus antitoxin or toxoid should be remembered in all injuries of this type.

Most extraocular foreign bodies may be handled without difficulty. They are to be found most frequently under the upper lid and next most frequently imbedded in the cornea. A moist cotton applicator does not damage corneal epithelium as much as a dry one. Any possibility of intraocular foreign body should be carefully evaluated and, if one is present or suspected, the patient should have the care of a specialist.

If an abrasion is not seen with focal illumination, it may show up after applying to the lower cul-de-sac a fine toothpick cotton applicator of merbromin (Mercurochrome) or fluorescein. The amount of stain thus released

is small enough to eliminate the need for irrigating excess stain from the eye. Lacerations of the lids may require plastic repair, especially if involving a lid margin or canaliculus. It should be remembered that plastic surgery is more easily done at the time of the initial wound before scar tissue has replaced and altered normal anatomical structures, but it should be delayed if other injuries make the patient's condition unsuitable for prolonged anesthesia. Lacerations of the globe should be examined as gently as possible to avoid increasing the damage; both eyes should be patched with sterile dressings and the patient should be kept on his back until surgical repair can be undertaken.

Contusions produce a variety of eye injuries, such as subconjunctival hemorrhages, mydriasis (the pupil may be permanently dilated), hyphemas, iridocyclitis, traumatic cataracts, vitreous hemorrhages, ruptures of the sclera or choroid, detached retinas, fractures of the orbital bones, especially the orbital rim, and rarely, avulsion of the optic nerve. Most of these conditions require special care and may be difficult to recognize without careful examination.

Although eye injuries in children caused by radiation are not common, from watching a welder at work or from exposure to rays from a quartz-vapor sun lamp, they may receive ultra-violet rays sufficient to cause damage. Because the symptoms of severe foreign-body sensation in the eyes do not occur for 6 to 10 hours, the patient may not readily recall having exposed himself. Repeated instillations of butacaine (Butyn) ointment or tetracaine drops may be used to relieve the pain while the corneal epithelium heals—usually within 24 hours. The short infra-red rays from electric arcs may rarely produce central retinopathy as may also visible rays of the sun. This condition is seen most often after an eclipse; the effect is produced by a concentration of rays resulting in a thermal burn of the macula, much like burning a piece of paper by focusing sunlight with a magnifying glass. Tinted glass, glass coated with soot, and photographic film—contrary to popular opinion—do not afford adequate protection for eclipse viewers. The safest way to observe an eclipse is to allow the sunlight to pass through a pinhole in a piece of cardboard and to focus the image on another piece of black cardboard, thus producing a clear image of the sun. Before every eclipse, the potential hazard to the eyes should be widely publicized. (Nelson, J. N., Eye Injuries in Children: A.M.A. J. Dis. Child., 97: 105-108, February 1959)

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Tic Douloureux

This article reports 25 years' experience in the surgical management of tic douloureux based upon 348 patients on whom 391 operations were performed. The incidence, diagnosis, surgical management, complications, and results involved in these cases are discussed.

The ages of the patients ranged from 26 to 90 years with 80% of them over 50 and 43% over 60. The ratio of males to females was 6:7, respectively. Eighty-three percent had symptoms for more than one year; 40% had symptoms for more than 5 years. Definite trigger mechanisms were recorded in two-thirds of the patients. Bilateral tic was present in 15.

Usually, the diagnosis of tic douloureux is simple—the sudden sharp shooting pains involving the second or third division of the trigeminal distribution on the face, associated in some cases with trigger zones on the face or in the mouth, are well known. Occasionally, there may be some difficulty in the diagnosis of the neuralgia involving the first division of the trigeminal nerve. In this instance, the pain is less apt to be sudden sharp and shooting in character, but does involve the forehead area in the distribution of the supraorbital and supratrochlear nerves with aching and, in some cases, burning; there is no evidence of trigger mechanisms in most cases. Experience has been that the supraorbital nerve is frequently hypersensitive and that its palpation often initiates the pain.

It should be emphasized that trigeminal neuralgia is not associated with neurologic deficits in the distribution of the fifth cranial nerve. When such deficits are shown to be present (anesthesia of the cornea, anesthesia or hyperesthesia of portions of the face, or masseter paralysis), then a paratrigeminal mass—either a tumor or aneurysm—should be suspected.

The surgical treatment of trigeminal neuralgia has been fairly well standardized. Patients experiencing the first attack of the disease are usually treated conservatively. There may follow weeks, months, or even years of freedom from pain. Others may give a history of an occasional pain in the face occurring for a few days every year or two. These patients may prefer conservative management also. Still others have repeated attacks of pain with the usual typical trigger zones and their condition becomes worse in time. They are candidates for surgical management. In a few instances, alcohol injection after blocking of the involved division with Xylocaine may be profitable. However, injection of alcohol into the various branches of the trigeminal nerve is becoming less and less popular with the advent of effective surgical management.

Total or subtotal section of the sensory root by the temporal approach, decompression of the sensory root and ganglion, section of the sensory root in the posterior fossa, medullary tractotomy, and avulsion of nerves of the face are the methods used in surgical management.

With repeated bouts of pain, decompression may be used with good results expected in 75 to 80% of patients. With recurrence of pain, the root may be partially or completely sectioned as needed. Among the very old patients, section of the sensory root may be a better initial procedure. Partial section should be preferred over complete section if section of the root is decided upon. If the patient has had alcohol injections with the last injection unsuccessful, section of the sensory root is preferred.

Numbness involving one or two of the divisions of the trigeminal nerve may be present following a decompression operation in which the operator is fairly sure that no gross damage was done to the fibers of the ganglion and the root. A facial paralysis may occur following this procedure and in some cases may be seen not immediately after the operation but 2 to 4 weeks later. Presumably, this may be due to trauma to the greater superficial petrosal nerve with traction upon the geniculate ganglion and the facial nerve in the facial canal.

With recurrence of pain among those with a partial section of the root, reoperation may employ either an intradural opening or an extradural dissection. Intradural dissection may be somewhat easier if the nerve had been partially sectioned extradurally before.

Peripheral facial paralysis is ordinarily seen soon after the operation. Occasionally, it may become manifest 2 to 4 weeks after surgery, particularly among those undergoing the decompression procedure. In a few instances, the paralysis may last for a week to 10 days. More frequently, it lasts for 2 to 6 months. The longer the paralysis lasts the less likely is normal return of function. Mass movements of the face and facial spasms are common in the group with imperfect return of motor function. When facial paralysis is seen after total section, lateral tarsorrhaphy is a good procedure to protect the cornea.

The problem of corneal ulcers is an important one, but in patients who have had decompression or partial section of the sensory root, this condition becomes much less likely. In the presence of a corneal ulcer, in those instances where complete section of the sensory root has been done, tarsorrhaphy is an excellent procedure.

Postoperative paresthesias of the face are common among these patients, but only occasionally are they severe or lasting. When they are severe, the patients complain bitterly and management is difficult and frequently unsuccessful. Among those with partial section, paraesthesias are less severe and more bearable. Although conservative treatment may be used in early cases, in many surgical treatment ultimately becomes necessary. Decompression of the sensory root was a satisfactory first step in 83% of patients. Those with recurrence of pain may then be treated by subtotal section of the sensory root. Thus, in most patients pain is not exchanged for a numb face. (Gurdjian, E. S., et al., *Experiences in the Surgical Management of Tic Douloureux: Surgery*, 45: 264-272, February 1959)

Tuberculosis and Carcinoma of the Lung

The principle of explaining all of the symptoms and findings of a patient as manifestations of the same disease entity is undoubtedly justified in the majority of cases. All physicians are familiar with exceptions to the rule, particularly in older patients in whom multiple diagnoses are not uncommon. The early recognition of two major diseases in the same patient presents a real challenge, particularly if both major diseases involve the same organ.

Coexistence of pulmonary tuberculosis and carcinoma of the lung is well known. In the cases reported, a common feature is the late diagnosis of the neoplasm with a paucity of survivals because the carcinoma is so far advanced that successful treatment cannot be applied. Many cases are recognized only at postmortem examination.

Famous pathologists have tried to correlate the etiology of the two diseases in one way or another and sometimes in exactly opposite ways. Today, it is generally accepted that the two diseases are associated only coincidentally. It is known that a disease which lowers the general resistance can activate or aggravate pulmonary tuberculosis. This applies not only in carcinoma but in other diseases, such as diabetes, Hodgkin's disease, and leukemia.

Two factors make the problem of coexisting pulmonary tuberculosis and bronchogenic carcinoma one with which physicians are confronted increasingly. First, the distribution of active pulmonary tuberculosis is moving constantly toward the older groups. Second, carcinoma of the lung is increasing in frequency and constitutes—according to newer statistics—at least 10% of all malignant tumors; in Rokitansky's time, it was accepted as less than 1%. The practical point to remember is that the two diseases coincide more frequently now than in the past. Any decrease in deaths or any appreciable increase in survival rate has to come by way of earlier diagnosis and treatment.

In 6 of 10 cases, the first manifestation of carcinoma was unilateral hilar lymph node enlargement. This is in accord with the findings of Rigler who pointed out that this very important sign is commonly overlooked and is usually present before symptoms appear. The problem is not one of diagnosis but of detection.

Conditions other than carcinoma can produce unilateral adenopathy, although these conditions are not frequent in older age groups. Active reinfection tuberculosis in adults seldom exhibits radiologically enlarged hilum nodes of tuberculous origin. Detection of hilar adenopathy is significant because then other more accurate diagnostic procedures may be carried out. Laminagraphy, bronchography, bronchoscopy, and cytology may be helpful in clarifying the cause of the enlarged hilus. Lymph node biopsy should be undertaken if simpler procedures fail to disclose the

diagnosis. The important fact is that these studies will not be performed unless the hilar adenopathy is detected. A hilus greater than 5.5 cm. in transverse diameter is suspicious; above 7.0 cm. should be considered abnormal and further evaluated. A difference of more than 2 cm. between the two hila should also be considered abnormal.

In some instances where hilar adenopathy is not present, the first manifestation of carcinoma may be the appearance of a pulmonary infiltrate near to, or remote from, the tuberculous lesions. The presence of such a lesion within the normally air-containing lung parenchyma is easy to detect. This may persist or increase in spite of the fact that the tuberculous disease is improving, cavities are closing, and the sputum of the patient is converted to a "negative" status. This should suggest the possibility of a second disease; malignancy should be the first consideration.

Tuberculosis patients often have a useful set of x-ray films. These will allow careful comparative study in answering the following specific questions: (1) Is the new infiltration associated with ipsilateral hilar adenopathy? (2) Is the new infiltration increasing in size in spite of treatment? (3) Does it contain calcium of the laminated or the so-called popcorn type, both of which are highly unlikely to be associated with malignant lesions? (4) Is metastatic bone involvement already present? (5) Has any new cavity appeared, particularly peripheral to a hilar or mediastinal mass? (6) Is the new lesion located anteriorly?

The clinical picture of the patient must also be taken into consideration. A unilateral wheeze which the patient did not have before is significant and should indicate a partial bronchial occlusion. Unexpected hemoptysis or blood-streaked sputum require investigation. Weight loss, anemia, and other symptoms which occur while the tuberculous process is improving radiologically will arouse the alert physician to the possibility of bronchogenic carcinoma. (Christoforidis, A. J., Browning, R. H., Pulmonary Tuberculosis Associated with Carcinoma of the Lung: A. M. A. Arch. Int. Med., 103: 75-82, February 1959)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

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Trichinosis in the United States

Among all intestinal nematodes, *Trichinella spiralis* has probably made the best adjustment for a parasitic existence. All stages of the life cycle are parasitic. The sexually mature worms reside in the small intestine and produce larvae which invade the musculature and internal organs of the host.

The definitive hosts for this parasite are usually carnivorous mammals, that is, those that eat the flesh and internal organs of infected animals. A survey of 2433 mammals representing 42 species in Alaska revealed an incidence of infection of 11.7% in 23 species. Some of the infected hosts were aquatic mammals, such as seals and white whales which are primarily fish-eaters, indicating that the epidemiology of *T. spiralis* may involve transfer or transient hosts.

In the United States, trichinosis is a disease of man and the domesticated pig as well as a sylvatic disease of many wild animal species. A survey of trichinosis from 1953 to 1955 in Iowa emphasised the sylvatic nature of this disease. Infected with trichinosis were 14 of 119 rats, 31 of 308 foxes, 1 of 40 opossums, 2 of 29 raccoons, 12 of 85 mink, and 2 of 4 coyotes. Examination of 2184 pigs revealed 1 infection and 18 of 1148 pork products contained trichina larvae. In the Arctic areas, the polar bear, dog, and wolf are heavily infected.

The incidence of trichinosis in the American population is not accurately known today. It is thought that 25 to 50 million Americans carry trichina larvae in their muscles and internal organs. A majority of these infections are symptomless and subclinical. Although most States do not make trichinosis a reportable disease, between 200 and 300 cases are reported each year to the Public Health Service. These are the recognized cases. Clinically, trichinosis has all the earmarks of so many other diseases that in all probability a large number of cases go undiagnosed. The mortality rate for recognized clinical cases was approximately 5% in the United States.

The epidemiology of this disease is well understood. How it is transmitted to man is known, also how to prevent its spread in the swine population. Serologic diagnosis in the suspected patient is being improved and important advances have been made in the treatment of the disease with ACTH and cortisone.

Trichinosis in the United States is perpetuated in a very small proportion (0.63%) of the swine population through the feeding of infected scraps of pork collected in garbage. It is generally conceded that the prohibition of garbage feeding would drastically cut the incidence of trichinosis in the domesticated pig, but it would probably not eradicate the parasite because of the sylvatic incidence of trichinosis in rats and other scavenging species.

Because the collection and use of garbage for swine production, involving approximately 35% of the communities of the United States, probably cannot be legislated out of existence, attention has been directed toward another measure, the sterilization of garbage by cooking. Every State has some type of law or regulation which prohibits the feeding of raw garbage to swine.

Garbage cooked at 100° C. for 30 minutes is freed of living trichina larvae. Approximately 11,747 (94.5%) of the 12,423 premises feeding garbage to hogs, report that they are feeding cooked garbage. Because of noncompliance by some farmers, the lack of adequate inspection facilities by some State agencies, and the expense of cooking garbage, the control of trichinosis by this method has not been completely successful. Continued education, research, and law enforcement by State and Federal officials will do much to strengthen this very effective method of trichina control.

Inspection of pork products constitutes another means of control. The Federal Government requires that "the respective States allow the sale of garbage-fed hogs for slaughter only at Federally inspected plant or plant having equivalent inspection."

The freezing of pork is also advocated for killing trichina larvae in infected carcasses. As early as 1914, research by the U.S. Bureau of Animal Industry indicated that refrigeration of pork at -15° C. (5° F.) for 20 days is an effective safeguard against trichinosis in man. Quick freezing at temperatures of -37° C. (-34.6° F.) kills trichina larvae in 2 minutes. In the United States today, meat packing plants do not have the space to freeze and store the huge volume of pork processed. The cost to the consumer for freezing pork would be approximately 5 cents per pound. This economic factor plus consumer resistance to the purchase of pork that has been frozen and thawed make this type of control impractical and difficult to initiate.

Sterilization of carcasses by irradiation has been carefully investigated by Gould and his co-workers. These workers have estimated that facilities using cesium-137 as the source of radiation, costing in excess of \$500,000 can effectively treat carcasses with 30,000 roentgens—enough radiation to make the larvae incapable of completing their life cycle in the host. The cost to the consumer is estimated at 0.23 cents per pound and the meat is said to be unaltered, healthful, and palatable.

The most effective and cheapest control method is the thorough cooking of pork by consumers. If they were aware of the hazards, many persons would not eat uncooked pork or pork products that have been smoked and not adequately heated prior to processing. Informing the producer on the farm about the dangers of feeding raw garbage to his swine and alerting the housewife, food handler, restaurant owner, and others to the dangers of eating pork not thoroughly cooked are among the control measures recommended by previous conferences on trichinosis. But it should be reiterated

that placing the responsibility for control of trichinosis on the consumer is not the most efficient method for controlling the disease.

One aspect of the epidemiology of trichinosis should be emphasized. Eradication cannot be accomplished solely by control measures initiated by the large farmer or food processor. A number of trichinosis outbreaks have been traced to pork products that did not pass through Federally inspected plants. The small farmer with a few pigs which are fed table scraps (uncooked garbage) and butchered in local abattoirs account for some of the incidence of trichinosis in the United States.

Little attention has been directed toward the use of long-lasting, broad-spectrum chemotherapeutic agents administered in the feed to eliminate *T. spiralis* and other intestinal roundworms in swine. In mice, medicated feed containing 0.15% of cadmium oxide produced a striking reduction in the number of adults and larvae harbored by infected animals.

The use of a skin test for the diagnosis of infection in pigs has not received much attention in recent years. Soulsby skin-tested animals in England and reported cross-reactions with *Ascaris* infections. With the application of newer immunochemical techniques, specific antigens could be prepared for this purpose.

Two flocculation serologic procedures are available for the diagnosis of trichinosis. The Helminthology Unit at the Communicable Disease Center uses the bentonite flocculation test for the diagnosis of trichinosis. This method has been found to be effective in detecting antibody during acute infections in man and animals.

To be successful, any control program for trichinosis must not conflict with the economics of pork production on the farm or at the processing plant. The control of trichinosis has benefited more from the measures taken to control vesicular exanthema than from all the recommendations made for the helminth disease.

Control will come when the American people are willing to pay the price of consuming trichina-free pork. Until that time, the scientific community must continue working on more efficient methods of control and on instructing the public in methods of protecting its health and well-being. (Kagan, I.G., Ph. D., *Trichinosis in the United States: Pub. Health Rep.*, 74: 159-162, February 1959)

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From the Note Book

1. CAPT Maurice Schiff MC USN, U. S. N. H., Oakland, Calif., has been notified of his selection as the 1959 recipient of the Harris P. Mosher Memorial Award, an honor that comes in connection with his election to active Fellowship in The American Laryngological, Rhinological, and Otolological Society, Inc., "The Triological Society." (TIO, BuMed)

2. CAPT C. T. Pridgeon DC USN and LCDR C. S. Scruggs DC USN, on duty at the U. S. Naval Support Activity, London, England, presented essays at the Annual Clinical Meeting of the American Dental Society of London on March 19, 1959, and at the 79th Annual Conference of the British Dental Association at Torquay, England, March 25 - 29, 1959. (TIO, BuMed)
3. A symposium on Medical Operations and Research in Climatic and Environmental Extremes was presented to coordinators of the Medical Education for National Defense at the U. S. Naval Medical School, NNMC, Bethesda, Md., 4 - 6 March 1959. (BuMed)
4. Naval Reserve officers serving on active duty may now submit applications for appointment in the Medical Service Corps in the Reserve according to BuPersInst. 1120.23A. Appointments are available in the following fields: administration and supply; optometry; and in the allied science field which includes bacteriology, biochemistry, entomology, physiology, clinical psychology, experimental psychology, and experimental aviation psychology. Women may specialize in dietetics, physical therapy, and occupational therapy. Eligibility requirements are listed in the Instruction. (TIO, BuMed)
5. The incidence of clinical tetanus is sufficiently high to make it obligatory that prophylactic measures be taken as part of the emergency treatment of any contaminated wound or severe burn. Antibiotic therapy should not be relied upon for the prevention of tetanus without proper debridement of the contaminated tissue and without passive or active immunization. (GP, February 1959; M. L. Maurer, M. D., A. M. Fuchs, M. D.)
6. The microflora found in normal ears differs significantly from the microflora found in the ears of patients with otitis externa and otitis media. A combination of polymyxin B, neomycin, and bacitracin is recommended in the treatment of external otitis and chronic otitis media. Furacin is very effective against infections due to gram-positive cocci. (Postgrad. Med., February 1959; W. M. Saunders, T. Suie, S. A. Sroufe)
7. The clinical observations and experiences of management of 143 patients with primary interstitial cystitis are discussed. Early diagnosis and conservative treatment are advocated. All lesions of interstitial cystitis should have a biopsy for tissue study. (J. Urol., January 1959; W. J. Baker, D. H. Callahan, Jr.)
8. In this investigation the authors have attempted to evaluate perphenazine, a new amino derivative of chlorophenothiazine for its effectiveness in reducing the amount of narcotic required for satisfactory analgesia and

anesthesia, reducing fetal narcosis; and producing the desired tranquilizing and antiemetic response. (Am. J. Obst. & Gynec., February 1959; T.G. Gready, Jr., M.D. et al.)

9. The onset, age incidence, clinical findings, and course of fifty-one consecutive cases of multiple myeloma are reviewed. There were 18 cases with myelomatous kidneys. Ten percent of the patients had findings of paraplegia. Two cases with "rheumatic arthritis" had amyloidosis complicating myeloma. (A.M.A. Arch. Int. Med., February 1959; H. Glenchur, M.D. et al.)

10. A survey of 80 cases of deep venous thrombosis indicates a serious failure rate in the form either of recurrent venous thrombosis or of originally occurrent or recurrent pulmonary embolism treated by anticoagulants. Heparin seemed more effective than Dicumarol in relieving the symptoms of venous thrombosis. Venous ligation, especially at the level of the vena cava, when tolerable by the patient and when supplemented by postoperative anticoagulant therapy seemed to offer the safest course with minimal morbidity. (Surgery, February 1959; W.F. Barker, M.D.)

11. The clinical, hematological, and pathological characteristics in Aldrich's syndrome (thrombocytopenia, eczema, and infection) are reviewed and 7 new cases presented. All patients were boys. The syndrome appears to be transmitted as a sex-linked recessive trait. (A.M.A. J. Dis. Child., February 1959; W. Krivit, M.D., R.A. Good, M.D.)

12. Results of an investigation to provide information applicable to the prevention of rabies in foxes are summarized and interpreted from the public health point of view. (Pub. Health Rep., February 1959; D.E. Davis, Ph.D., J.E. Wood, Ph.D.)

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Military Pediatrics

A Standing Committee on Military Pediatrics was recently established by the Executive Board of the American Academy of Pediatrics. This tri-service committee, composed of MAJOR B.H. Berrey (MC) USA, Chairman; CAPT W.I. Neikirk MC USN; CDR F.B. Becker MC USN; and MAJOR T.M. Holcomb (MC) USAF has received the support of the Surgeons General of the Army, Navy, and Air Force.

The scope of the committee's activities will include fostering high standards of Pediatric training through liaison with the respective Surgeons General and the Academy of Pediatrics, stimulating study and research into the practice of Pediatrics, especially in the Uniformed Services, and studying

the problem of management of mass casualties as it relates to the Pediatric population of the United States.

Meetings of this committee will be held during the Annual Meeting of the Academy of Pediatrics and all Medical officers specializing or interested in Pediatrics are encouraged to attend. (ProfDiv, BuMed)

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Aviation Prescription Sunglasses

Requests for prescription sunglasses are being received in accordance with BuMed Instruction 6810.4 of 18 June 1958, and the item in the BuMed News Letter of 19 December 1958. A review of the status of the funds for the procurement of this item has revealed that sufficient funds remain in the Fiscal Year 1959 budget to provide prescription sunglasses for Naval aviators and for a number of aircrewmembers and other flight deck personnel. Requests previously denied for aircrewmembers should be resubmitted.

Attention is invited to the availability of occupational bifocal sunglasses which have a second segment at the top of the lenses of particular value to presbyopic aviators for viewing overhead instruments and radio controls. All requests should be forwarded promptly to the Ophthalmic Lens Laboratory, U. S. Naval Supply Center (Norfolk), Cheatham Annex, Williamsburg, Va., in accordance with paragraph 6. of BuMed Instruction 6810.4. (AvMedDiv, BuMed)

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ATTENTION FLIGHT SURGEONS!

PROCUREMENT OF OPNAV FORMS 3750-8, -8A, -8B, -8C, -8D, -8E, (Medical Officer's Report of Aircraft Accident, Incident, or Ground Accident, pages 1 through 6)

A recent tabulation showed that Navy and Marine units had placed orders for 16,740 page sets of Form 3750-8. With normal usage, such a supply would suffice for a period of 10-15 years; while paragraph 57(e) page 34, of OpNav Instruction 3750.6C clearly states "quantities requested are not to exceed a six months' requirement."

In addition, instances have been reported wherein NavAer 140 has not been used in ordering these forms and in other instances the order has not been sent to the proper supply point.

In view of this situation, the following details should be clearly understood:

1. A great deal of effort and expense was involved in making the preparation of this form by the user as easy and straightforward as possible.

2. The forms should not be stockpiled (beyond normal requirements) where adverse conditions may deteriorate the interleaved carbon paper.
3. The Naval Aviation Safety Center cannot process its accident data without receipt of this new form.
4. Use of the old form 3750-8 (Rev. 2-54) obstructs the Safety Center's painstaking coding of accident data.
5. A fresh supply of the new forms is now available from the following supply points: NAS North Island, NAS Alameda, NAS Norfolk, NAS Jacksonville, and NSD Guam.
6. Paragraph 57(e), page 34, of OpNav Instruction 3750.6C contains explicit instructions on the procedure for ordering these forms.
7. A careful reading of the entire section H (pp 33-50) of the above Instruction is not only essential to the proper preparation of the forms, but also will reveal many time-saving aspects.

THE FOLLOWING ACTION IS REQUIRED OF ALL FLIGHT SURGEONS:

1. CONSIDER ALL PREVIOUS ORDERS FOR THE FORM CANCELLED.
2. REORDER A REALISTIC QUANTITY BASED ON AN ANTICIPATED SIX MONTHS REQUIREMENT.
3. RETURN AT ONCE EXCESS SUPPLIES OF THE FORMS PRESENTLY ON HAND TO THE NEAREST SUPPLY POINT.

(AVMEDDIV, BUMED)

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DEEP FREEZE V
1959 - 1961

General Medical officers and Flight Surgeons are needed for Operation DEEP FREEZE V which supports the U. S. Antarctic Research Program, a continuation of the International Geophysical Year in the Antarctic.

This is an opportunity for adventuresome volunteers under 45 years of age to get into a new and growing field of military medicine. Doctors selected will report to Construction Battalion Center, Davisville, R. I. in the spring or early summer of 1959 for several months of special training prior to embarking for New Zealand and Antarctica in the fall of 1959. They will return to CONUS in the early spring of 1961. All possible consideration will be given to preference for duty assignment upon completion of a tour of duty in Antarctica. Reserves, Regulars, and the graduating class of interns will be considered. Volunteers notify BuMed by dispatch. (ProfDiv, BuMed)

Navy Mutual Aid Association

The Board of Directors of the Navy Mutual Aid Association, February 26, 1959, announced the election of ADM Arleigh Burke USN as President. Other officers elected by the membership were RADM A. H. Van Keuren, USN (Ret), First Vice President, VADM Frank Baldwin SC USN (Ret), Second Vice President, LTGEN R. E. Hogaboom USMC, Third Vice President, RADM K. K. Cowart USCG, Fourth Vice President, and CAPT R. R. Rambo MC USN, Vice President-Medical Director.

CAPT T. S. Dukeshire SC USN (Ret) was reelected as Secretary and Treasurer and LCDR T. L. Jackson MSC USN (Ret) as Assistant Secretary and Treasurer. All officers and directors serve without compensation with the exception of the full-time Secretary and Treasurer and his assistant.

ADM Burke remarked that the Navy Mutual Aid Association exists specifically for the purpose of rendering immediate and practical help to the families of officer personnel. Navy Mutual Aid has for more than 80 years provided the answer to this continuing problem.

CAPT Dukeshire reported that membership in the Association had passed the 25,000 mark. Assets increased by nearly \$4,000,000 to a total of Thirty-Nine and One-Half Million Dollars. The net investment increase on the Association's high grade bond portfolio increased from 3.32% in 1957 to 3.58% in 1958. Operating expenses decreased from 3-1/2% of the total income to 2-1/2%. During the same period, the Association had the most favorable mortality experience since 1888, the death rate from all causes including aviation being 6.29 per 1000 as compared with 8.11 in the previous year. (NavMutAid)

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Recent Research Reports

Naval Dental Research Facility, NTC, Bainbridge, Md.

1. Survey of Dental Health. VI. Relation of Place of Birth, NM 75 01 26.04, 30 September 1958.
2. Survey of Dental Health. VII. Relationship of the Score on the General Classification. NM 75 01 26.04, 15 October 1958.
3. Survey of Dental Health of the Naval Recruit. VIII. Relation of Formal Education. NM 75 01 26.04, 15 October 1958.
4. Survey of Dental Health. XII, Relation of Brothers and Sisters. NM 75 01 26.04, 30 November 1958.

Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Coronary Arteriography. New Electronically Controlled Method. NM 71 03 00.01.02, 31 October 1958.

Naval Medical Research Unit No. 3, Cairo, Egypt

1. Microbiologic Study of Liver Biopsies in Chronic Fibrocaceous Pulmonary Tuberculosis Cases in Egypt. NM 72 01 03.12.01, July 1958.

Naval Air Development Center, Johnsville, Pa.

1. An Elastic Reservoir Theory of the Human Systemic Arterial System Using Current Data on Aortic Elasticity. Report No.7, NM 11 01 12.6, 7 November 1958.

Naval Medical Research Laboratory, Submarine Base, New London, Conn.

1. Measurement of Dextrose in Standard Solutions with Dreywood's Anthrone Reagent and the Klett-Summerson Photoelectric Colorimeter. Report No.294, NM 24 01 20.02.01, 10 April 1958.
2. Effects of Carbon Dioxide as Related to Submarine and Diving Physiology. Memorandum Report 58-11, NM 24 01 20.01.02, 20 August 1958.
3. Photometric Survey of the Red Lighting Installation on the USS Swordfish (SSN-579). Memorandum Report 58-12, NM 22 02 20.01.03, 17 October 1958.
4. Report on a Direct-Current High-Pressure Xenon Arc. Memorandum Report 58-8, NM 22 01 20.01.03, 6 November 1958.
5. Photometric Survey of the Red Lighting Installation on USS Growler (SSG-577). Memorandum Report 58-13, NM 22 02 20.01.04, 9 December 1958.

Naval School of Aviation Medicine, NAS, Pensacola, Fla.

1. Evaluation of Certain Visual and Related Tests. V. Retinal Rivalry. Subtask No. 6, Report No. 5, NM 14 01 11, 11 August 1958.
2. Study of the Variables from the Bureau of Naval Personnel's Aviation Score Sheet. Subtask No. 15, Report No. 1, NM 16 01 11, 1 September 1958.
3. Non-Auditory Effects of High Intensity Sound Stimulation on Deaf Human Subjects. Subtask 2, Report No. 5, NM 13 01 99, 8 September 1958.
4. Non-Medical Correlates of Medical Complaints. Subtask No. 4, Report No. 6, NM 16 01 11, 15 September 1958.

Naval Air Material Center, Philadelphia, Pa.

1. Frequency Spectrum and Tissue Noise in Surface Electromyography. Preliminary Report. NM 17 01 13 1, 17 November 1958.

Naval Medical Research Unit No. 2, Taipei, Taiwan

1. Second Asian Influenza Epidemics Occurring in Vaccinated Men Aboard U.S. Navy Vessels. NM 52 05 02.4.2, 6 January 1959.
2. Pharyngoconjunctival Fever in Taiwan. Report of Four Cases Caused by Adenovirus Type 3. NM 52 05 02.1.0.1, 20 January 1959

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Requests for Early Release from Active Duty
by Reserve Medical Officers

During recent weeks, the Bureau of Naval Personnel has received many requests from Reserve Medical officers for early release. Because many of these officers are scheduled to begin residency training about 1 July 1959, their desire for early release is understandable. However, the Bureau of Medicine and Surgery and the Bureau of Naval Personnel have had to disapprove the requests with great regret for the following reasons:

1. The costs incident to an officer's separation, such as his travel, his dependents' travel, and the lump sum payment of his accrued leave, become a very sizable sum when considering the number of officers concerned. If an officer completes his separation processing on 1 July or later, these costs are charged to Fiscal Year 1960 funds, but if he completes separation processing prior to 30 June, the costs must be paid from Fiscal Year 1959 funds. Unfortunately, funds remaining in Fiscal Year 1959 budget are not sufficient to defray the costs involved in the early release of officers scheduled for release in Fiscal Year 1960.

2. Approximately 400 Reserve Medical officers are scheduled for release from active duty in July 1959, and reliefs will not be available until the latter part of July or early August. Even with those to be released remaining until the scheduled release date, the hiatus between departees and replacements will produce a great hardship on personnel in many activities already overburdened by heavy workloads.

In spite of the fact that the Navy would like to grant the requests of those who have served in a highly satisfactory manner, the factors discussed above preclude such action. Realizing the importance of residency training, every effort is being made to assist officers wherever budgetary limitations permit. Each officer's release orders will be issued as soon as possible to enable him to use annual leave if authorized by the Commanding Officer prior to separation, to complete the settlement of his dependents and household effects. He cannot, of course, be reimbursed for his dependents' travel until separation. In addition, orders will be written with maximum permissible flexibility so that the Commanding Officers may, if local workload permits, approve the earliest possible date of release.

(ProfDiv, BuMed)

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Correction. In News Letter, Vol. 33, No. 5, dated 6 March 1959, page 15, para. 2, line 2 of article Acute Cholecystitis should read: "Eighty-two patients (62%) were women, twice as many as men," and not "were men."

DENTAL**SECTION**Navy Dental Care - Calendar Year 1958

During calendar year 1958, some 7,475,000 dental procedures were performed in Navy Dental facilities. A breakdown of procedures reveals approximately 3,079,000 operative and crown and bridge procedures, 83,000 prosthodontic procedures, 394,200 oral surgery procedures, and 575,300 periodontic procedures. Approximately 1,702,000 radiographs were taken and 1,641,500 dental examinations and postoperative treatments were given.

Of the total number of dental procedures rendered, 6,890,000 were performed for Navy and Marine Corps personnel, 74,000 for U.S. Army and U.S. Air Force personnel, and 373,000 for military dependents. Approximately 285,000 procedures were performed for dependents overseas.

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Armed Forces and Public Health Section
in Journal of Oral Surgery

The Editorial Board of the Journal of Oral Surgery, Oral Medicine and Oral Pathology has instituted a section devoted to the Armed Forces and Public Health Service in its publication. Rear Admiral Curtiss W. Schantz, Chief, Dental Division, Bureau of Medicine and Surgery, has been appointed as an advisor, and Captain Theodore A. Lesney DC USN, Chief of Dental Service, U.S. Naval Hospital, San Diego, Calif., has been appointed as Associate Editor. Captain Robert A. Colby DC USN, U.S. Naval Dental Clinic, Yokosuka, Japan, is Editorial Consultant for Oral Pathology.

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Malpractice Suits

The question of malpractice suits against Navy Dental officers arises periodically. The subject is covered in the Manual of the Medical Department, Articles 3-29 and 6-36. Some salient facts not covered in the Manual are:

1. A Dental officer may be sued alone or in conjunction with the Federal Government.
2. Malpractice suits against an officer may include his commanding officer (U.S. Naval Dental Clinics), senior Dental officer, or chief of Dental service even though they have no part in the treatment.
3. The Federal Tort Claims Act does not constitute a protective umbrella for the Navy Dental officer.
4. The Federal Government does not, of necessity, have to provide counsel.

The purchase of malpractice insurance is a matter of personal concern to the individual Dental officer. The Armed Forces Medical Journal of February 1958, page 224, contains an excellent discussion of this subject.

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Board Certification

Captain Louis S. Hansen DC USN was certified recently by the American Board of Oral Pathology. Captain Hansen who is the third Dental officer of the Navy to be so certified is on the staff of the U. S. Naval Dental School, National Naval Medical Center, Bethesda, Md.

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Newly Standardized Anesthetic

A newly standardized dental anesthetic is now available for issue and will supplement FSN 6505-261-7240, Lidocaine Hydrochloride with Epinephrine Injection, Cartridges, 2%, 1.8 cc., 50s; presently classified as Standard type. New item and description is:

<u>Stock No.</u>	<u>Item Description</u>	<u>Unit Issue</u>	<u>Fraction Code</u>	<u>Unit Price</u>
6505-576-8842	Lidocaine Hydrochloride with Epinephrine Injection, Cartridges, 2%, 1.8 cc., 50s:NNR quality. Each cc. contains 20 mg. of lidocaine hydrochloride and 0.01 mg. (1:100,000) of epinephrine. For use with cartridge syringe, 6515-559-3000.	Can	F	\$2.90



RESERVE SECTION

Appropriate Duty Assignments

Naval Reservists who are members of drilling units may now be issued appropriate duty orders to accomplish certain tasks in support of the Naval Reserve and Naval Service generally.

1. Medical and Dental officers may be issued appropriate duty without pay orders as consultants at Naval hospitals. (Detailed information concerning assignment as a consultant is contained in BuMed Instruction 101.1A of 26 June 1958).

2. Naval Reservists may be assigned appropriate duty orders without pay for representing their commandant in local areas where he cannot be represented by suitable active duty personnel. Such representation includes attendance at public ceremonies and other matters concerned with legal duties, public relations, the administration of the Naval Reserve in a local community, and recruiting personnel for membership in drilling units. (This includes recruiting of medical students and clinical psychologists at colleges and universities).

3. Attendance at symposia or other training or lecture programs conducted under the auspices of the Armed Forces; (Symposia must be sponsored by, and under control of, the military and may be conducted in conjunction with professional conventions. In this event, they must have received prior approval of the Bureau of Medicine and Surgery and the Chief of Naval Personnel).

These important changes have been authorized by the Chief of Naval Personnel in BuPers Notice 5400, dated 6 February 1959, which promulgates Ch. 2 to BuPers Instruction 5400.1G (Subj: Tables of Organization for the Naval Reserve, Fiscal Year 1959).

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Course in Functions of the Medical Department.

This Course (NavPers 10708-2, 1959 Edition) is based on Part I of the Manual of the Medical Department. It is designed to provide MD personnel with fundamental knowledge of the significant functions of the Medical Department

in its relation to the Naval Establishment ashore or afloat in all of its activities. In addition to the delineation of authoritative methods and procedures, the material embraces discussions of approved essential organizational structure of all types of MD components; these range from the Bureau of Medicine and Surgery through various field agencies in all areas of activities, in the regional and district medical staffs, to MD organization in ships and on shore stations.

Because the Medical Department is guided in matters of administration by Navy Regulations, current directives of the Bureau of Medicine and Surgery and the Manual of the Medical Department, certain chapters of the Manual have been selected as the principal text for the course. The text constitutes chapters 1 through 14, 17, 18, 20, 21, and 22. It incorporates page changes 1 through 6 and is a minor revision of the previous course. SecNav Instructions 6320.8 and 6320.9 relating to the Medical Service—Dependents' Medical Care and Comptroller Fiscal Policies—Dependents Medical Care and BuPers Instruction 1750.5A as reflected in BuPers Notice 1750 of 8 May 1957, are furnished as supplementary reading material, but no questions are based upon this material.

The course consists of nine (9) objective type assignments and is evaluated at twenty-four (24) Naval Reserve promotion and/or nondisability retirement points. Naval Reserve personnel who previously completed course NavPers 10708-1 will not receive additional credit for completing the revised course, NavPers 10708-2.

Applications for this course should be submitted via applicant's command, to the Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md. (Attn: Correspondence Training Division).

Medical personnel may be enrolled in more than one Medical Department correspondence course at one time.

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Accreditation for Attending Professional Meetings

Frequently, the Chief, Bureau of Medicine and Surgery receives letter requests from organizations and societies of the medical profession requesting that their annual meeting or convention be approved for the awarding of Reserve retirement points to eligible inactive Reserve MD personnel who might attend. In some instances, the requests cannot be approved as certain requirements set forth in Department of Defense Instruction 1215.7 and Department of the Navy policy have not been complied with.

Because many Reserve Medical Department officers are members and executives in these societies and organizations, the publication of the requirements prerequisite to authorizing retirement point credits should serve in the best interests of all concerned.

The requirements are:

1. Symposia, conventions, meetings, and seminars presented by professional medical and allied science societies must designate a period or periods identified as a military section. The military section presentation must be of at least 2 hours or more in duration each day in order to earn one retirement point credit.
2. The military section must present subjects of a medical military nature which could reasonably be expected to improve the individual Reservist's fitness to perform military duty to which he might be assigned in the event of mobilization.
3. The lecturers, moderators, or panel members should in the majority be of the military services either active or inactive. This in no way precludes the occasional utilization of civilian lecturers or instructors.
4. The planned program must be submitted in advance with a letter to the Chief, Bureau of Medicine and Surgery, who will appropriately endorse such request and forward it to the Chief of Naval Personnel. The Chief of Naval Personnel will evaluate the request and if he approves, he will authorize retirement point credits to be awarded eligible inactive Naval Reservists who attend and record their attendance.

Following approval by the Chief of Naval Personnel, the Chief, Bureau of Medicine and Surgery will appropriately inform the requesting organization or society and timely publicity will be provided through the various Navy Department and Bureau publications.

Seminars, conventions, and annual meetings approved for Reserve accreditation earn only retirement point credit. Reserve promotion points must be earned through other approved methods.

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OCCUPATIONAL MEDICINE

Meeting of American Academy of Occupational Medicine

The 11th annual meeting of the American Academy of Occupational Medicine was held in the Sheraton-Plaza Hotel, Boston, Mass., February 11 - 13, 1959. Captain Lloyd B. Shone MC USN attended as representative of the Bureau of Medicine and Surgery.

The meeting was formally opened at 9:15 a. m. with Doctor Ronald F. Buchan President of the Academy of Occupational Medicine, presiding. Upon conclusion of his introductory remarks, Dr. Buchan introduced Doctor Charles C. Lund, President of the Massachusetts Medical Society. Dr. Lund welcomed members

of the Academy to Boston and extended best wishes in behalf of himself and the other members of the Massachusetts State Medical Society for a fruitful meeting and a pleasant visit to Boston.

The following is a resume of the professional program presented during the Academy's 11th annual meeting:

Pharmacological and Biochemical Approaches to Mental Disorders

1. Physiological Basis for Consciousness
Elwood Henneman, M.D., Assistant Professor of Physiology,
Harvard Medical School
2. Biochemical Aspects of Schizophrenia
Mark Altschule, M.D., Assistant Professor of Medicine,
Harvard Medical School

Health Information for Employees

Richard J. Sexton, M.D., Charleston, W. Va.

Massachusetts Institute of Technology - Field Trip

Harriet L. Hardy, M.D., Assistant Medical Director
in Charge of Occupational Medical Services

George F. Wilkins, M.D., Boston, Mass., presided over the following:

Transplantation of Normal Human Tissue - Present Status and Future

Moderator - John P. Merrill, M.D., Assistant Professor
of Medicine, Harvard Medical School, Senior
Associate in Medicine, Peter Bent Brigham
Hospital

Participants - Joseph E. Murray, M.D., Director of Surgical
Research Laboratory, Harvard Medical School
Gustav Dammin, M.D., Professor of Pathology,
Harvard Medical School
John R. Brooks, M.D., Clinical Associate in
Surgery, Harvard Medical School
Somers H. Sturgis, M.D., Clinical Professor
of Gynecology, Harvard Medical School

Immunologic Basis for Rejection of the Homograft
Doctors Merrill and Dammin

Clinical Experience with Homografts and Isografts
Doctors Murray, Sturgis, and Dammin

Approaches to the Homograft Problem

Doctors Merrill, Murray, and Brooks

Recent Advances in the Therapy of Infectious Diseases

Louis Weinstein, M.D., Professor of Medicine, Tufts University
School of Medicine

Leonard J. Goldwater, M.D., Professor of Occupational Medicine,
Columbia University, presided over the following:

Fatalities from the Use of EDTA in Lead Intoxication

Heinrich Brugsh, M.D., Division of Occupational Hygiene,
Commonwealth of Massachusetts

Recent Investigations on Atmospheric Pollution

Mary O. Amdur, Ph. D., Assistant Professor of Physiology,
Harvard School of Public Health

Physiological Aspects of Human Fatigue

William S. Frederik, M.D., Lecturer on Physiology,
Harvard School of Public Health

Harriet L. Hardy, M.D., presided over the following:

Ocular Effects of Radiation

David G. Cogan, M.D., Professor of Ophthalmology,
Harvard Medical School

Symposium on the Nuclear Reactor and Its Products

1. Fundamentals of a Nuclear Reactor
Theodore J. Thompson, M.D., Professor, Department
of Nuclear Engineering, Massachusetts Institute of
Technology
2. Health Hazards Associated with a Nuclear Reactor
Constantine Maletskos, Ph. D., Radiation Biologist,
Massachusetts Institute of Technology
3. Chemical Applications of Reactor Products
Martin Lubin, M.D., Ph. D., Professor of Pharma-
cology, Harvard Medical School

The Academy's annual banquet was held at 7:00 p. m. on February 12. It is the custom during the banquet to present an Academy award in the form of a plaque to a physician whose work in the field of occupational medicine has been outstanding. This year, the award was given to James H. Sterner, M. D. Also during the banquet, some person who has distinguished himself in the field of occupational health is called upon to deliver the George Gehrman Lecture. This year's Lecture was given by Professor Philip Drinker of the Harvard School of Public Health.

An election of officers for the ensuing year was held during the annual business meeting, February 12, 1959. The following members were elected to office:

Leonard J. Goldwater, M. D., President
Joseph A. Quigley, M. D., Vice President
James H. McDonough, M. D., Treasurer
Lloyd B. Shone, CAPT MC USN, Secretary

(OccMedDispDiv, BuMed)

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The 1959 Industrial Health Conference

The 1959 Industrial Health Conference will be held in the Hotel Sherman, Chicago, Ill., 25 April - 1 May 1959. This Conference, jointly sponsored by the Industrial Medical Association, American Conference of Governmental Industrial Hygienists, American Industrial Hygiene Association, American Association of Industrial Dentists, and American Association of Industrial Nurses, Inc., is one of the most important educational meetings of the year for Naval occupational health personnel.

As in the past, this Conference will afford unsurpassed opportunity for the presentation and discussion of new problems in the field of industrial health which have arisen incident to rapid technological progress. Preliminary information received from the program planning committee indicates that this will prove to be an outstanding Conference. Recognized leaders in the field of industrial health will be present representing major private industries in the United States and Canada. There will be discussions of mechanisms believed to be most effective in carrying out preventive health measures dealing with preplacement and periodic physical examinations, radiation hazards, sight conservation, hearing conservation, and industrial toxicology. All of these mechanisms are applicable in lowering the over all cost of industrial production and in maintaining a condition of readiness in the Navy. In order to have an adequate and progressive occupational health program in the Navy, it is considered highly desirable that Naval and civilian personnel

concerned with the Naval occupational health program attend this Conference. Such participation is particularly pertinent as efforts continue to be made to integrate more civilian physicians into the Navy's occupational health program and to maintain and improve the present low rates of industrial sickness and accidents.

It is highly recommended that industrial medical officers, industrial hygienists, and industrial nurses attend this important Conference. Attendance of any one individual will be contingent on the extent to which his activity can spare him and the availability of per diem funds. Because the Conference is sponsored primarily by nonfederal organizations, orders for attendance must be processed in accordance with SecNav Instruction 4651.8A of 4 November 1955. For this reason, applications for orders should be processed at an early date. (OccMedDispDiv, BuMed)

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Occupational Dermatitis

The vast protective envelope, the skin, which is constantly exposed to potential injury from physical, chemical, and biological sources, in most circumstances withstands the onslaught without any abnormal effect to the skin itself or to other organ systems. However, when the inherent cutaneous defenses are unable to cope with a particular chemical exposure, the consequences may include percutaneous absorption and systemic intoxication with cutaneous damage, or cutaneous damage without systemic intoxication. In a working environment, the causes of cutaneous insult or damage may be:

1. Physical. Among the physical causes are friction, pressure, electricity, heat, cold, and radiation (ultraviolet, infrared, alpha, beta and gamma rays, and roentgen radiation).

2. Chemical. The chemical factors in the environment afford the greatest source of injury by primary irritation, by necrotizing action, or by allergic sensitization. The chemical incitant may cause an acute or a chronic inflammatory reaction. The chemical agent may act specifically on the epidermal cells as do keratogenic or carcinogenic agents; on pigment formation; or on the pilosebaceous apparatus.

3. Biological. Among the biologic incitants of cutaneous disease are the botanical or plant irritants or sensitizers; bacteria and fungi; the protozoa; and the arthropods—infections or infestations which may be incurred in working environments.

Because the skin is a complex organ system and histologically heterogeneous, a particular occupational incitant may predominantly affect a single tissue component or several components of the skin. The type of pathologic response may vary with the specific stimulus, and the pathologic patterns as well as structures may be involved in specific occupational dermatoses.

Inflammatory Reactions Contact dermatitis may be of primary irritant origin or may involve the delayed type of allergic hypersensitivity. In either case, the reactive tissues are chiefly the epidermis and the blood vessels and reticuloendothelial cells of the dermis. If the reaction is severe and prolonged, the appendages may be affected as well. Symptoms range in severity from mild itching to a severe eczematous dermatitis.

In allergic contact dermatitis the chemical sensitizer presumably conjugates with skin protein to form the allergen. This new substance, the antigen, is capable of altering enzyme systems involved in the production of cellular protein. The altered cellular protein which is part of, or becomes fixed in, the reticuloendothelial cell, constitutes the cell-fixed antibodies of hypersensitive persons.

Epidermal Effects. The epidermis responds quickly to injury and has a remarkable restorative capacity. Repeated and prolonged trauma stimulates mitosis and results in hyperplasia. Repeated exposure to ultraviolet radiation and critical exposures to ionizing radiation and specific cyclic hydrocarbons will cause epidermal cells to lose their normal characteristics and become neoplastic.

Pilosebaceous Reactions. Chemical substances of related structure appear to single out the pilosebaceous unit and alter sebaceous structure and function specifically. Occupational acne is a rather common skin disease which may result from exposure to petroleum cutting oils, coal tar fractions, and chlorinated hydrocarbons, such as chlorinated naphthalenes, diphenyls, diphenyloxides, benzols, and phenols. The chemical stimulus provokes the proliferation of follicular epithelium in the sebaceous duct and follicle opening (infundibulum). These cells become keratinized and plugging of the orifice results. This prevents extrusion of sebum and that which is formed is retained. The lipid-bearing cells are then replaced by keratinizing cells and the entire process eventually results in a sac filled with keratin lamellae and retained sebaceous lipid. This is the sequence of events which occur in the evolution of the comedo or milia and are identical with the cutaneous events which occur in acne vulgaris.

Unhygienic exposures to cutting oils frequently result in folliculitis. This may be simply the result of follicular or perifollicular irritation by the hazardous material, with a secondary inflammatory reaction, complicated by acne, and frequently accompanied by bacterial infection.

Pigmentary Disturbances. Occupational environments may alter pigment formation in several ways. The inciting factor may lead to either local hyperpigmentation or to a reduction of pigmentation. In most instances, the pathologic process can be explained on the basis of interference with the biochemical synthesis of melanin and disturbance of one or more of the physiologic factors regulating melanin formation.

Chemical materials which enhance the action of ultraviolet light on the skin, such as coal tar products, low-boiling petroleum products, essential

oils, and certain dyes, both increase the degree of inflammatory reaction to the erythematogenic wave lengths and cause hyperpigmentation at the exposed site.

Decrease in pigmentation or pigment loss (leukoderma) may be acquired in industrial exposures to agerite alba, a rubber antioxidant which is the monobenzylether of hydroquinone. The explanation of its effect lies in the fact that the latter substance is chemically very similar to the quinone intermediates evolved in melanin synthesis, and it probably competes for the enzyme tyrosinase with such compounds as dopaquinone. The agerite alba may veritably remove the tyrosinase from the reaction and cause a halt in new melanin formation.

The Eccrine Sweat Glands and Ducts. A cutaneous problem of considerable importance which is provoked by working environments in which the environmental temperature is high is prickly heat, or miliaria rubra. The pathogenesis of this disease has been ascertained and lesions reproduced in experimental subjects. The orifice and upper portion of the sweat duct may, in hot humid atmosphere, become occluded by keratin maceration and non-specific irritation. This occurs especially in environments in which chemical agents may cause some damage to the duct orifice. Epidermal injury produces abnormal keratinization and hyperkeratotic plugging of the duct orifices. When the glands are subsequently stimulated thermally, sweat secretion is trapped in the plugged ducts. As pressure increases, the sweat breaks through the duct wall and extravasates into the skin, resulting in vesicle formation and frequently an inflammatory response in which the discomfort from pruritus is severe. In World War II, among American troops in the South Pacific Theater, prickly heat was one of the major causes of inactivation of combat personnel.

Collagen and Elastic Tissue Damage. Collagen and elastic tissue degeneration and fragmentation are among the cutaneous effects of prolonged exposure to sunlight. Persons who work out of doors, such as farmers, ranchers, road construction workers, and sailors are more likely to exhibit these tissue changes. Among the chronic effects of overexposure to ionizing radiation (radiodermatitis), sclerotic, degeneration collagen fibers are generally observed.

Blood Vessel Changes. The blood vessels of the skin are notably reactive to irritants and sensitizers. They are singularly damaged in prolonged low temperature exposures as in pernio, immersion foot, and frostbite. The blood vessels constitute an area of fundamental pathologic change resulting from prolonged and excessive exposure to ionizing radiation. The vessel walls become fibrotic with varying degrees of occlusion leading to ischemic changes, including atrophy, necrosis, and ulceration. Chronic radiation effects are also manifested by irreversible dilatation of the capillaries and telangiectasia.

Sensory Perception Problems. While cutaneous sensation is informative as well as protective, potential and actual damage will be reflected in cutaneous feeling. Pain, for example, is experienced with injury by specific mechanical trauma, radiation, heat, cold, electrical energy, and chemical irritants. It is experienced with a severe inflammatory response to infection. Itching is apparently a variant of pain subserved by the same receptors and nerve fibers and elicited by stimuli which are quantitatively lower than the threshold level for pain. It is an ever present symptom of many skin diseases, including those of occupational origin. The superficial inflammatory reactions provoked by primary irritants and allergic sensitizers are characterized by pruritus as well as the objective signs of inflammation. (Suskind, R. R., Occupational Skin Problems: Journal Occupational Medicine, 1: 39-45, January 1959)

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Hazards of Noise Exposure

Hearing loss resulting from exposure to noise has long been a problem. As early as 1880, there were reports describing the effects of railroad noises upon hearing. Some 10 years later there were descriptions of the types of hearing losses occurring among boiler makers. For years the expression "boiler maker's ears" has been used to describe the general effects of noise exposure on hearing.

Within the last decade the entire problem of hearing loss resulting from noise exposure has become a matter of great concern. The Subcommittee on Noise, American Academy of Ophthalmology and Otolaryngology, under the direction of Dr. Aram Glorig, has carried the burden of continuing the investigation of the noise problem. There is no question that, in this field, this is an outstanding group. The Subcommittee has numerous reports which are available and, in general, will answer questions relating to hearing loss in industry.

The question naturally arises: Where are we now? It has been definitely shown that within one age group those employees who have had a number of years of continuous exposure to loud noise will have an average hearing loss that is greater than the average hearing loss of similar individuals who have not been exposed to noise. The excess hearing loss measured for the group exposed to noise cannot be explained by any known cause other than exposure to noise. As a result, it is commonly stated that noise exposure can cause permanent loss of hearing.

Noise Exposure. An extremely important concept that must be stressed and clearly understood is "noise exposure" which includes not only the type of noise but the type and length of exposure. A noise cannot be rated as hazardous until the question of noise exposure has been resolved. Long

continuous exposure to relatively moderate noise can produce significant hearing losses in persons who are especially susceptible to noise exposure. However, little is known about the effects of intermittent exposure to either steady noises or to impulse noises. This is the area where the pioneering work is being done. In general, there is an "engineering understanding" of the question of continuous exposure. Intermittent exposure is probably more frequently encountered by a larger number of people than is continuous exposure.

Susceptibility. Some persons lose a small amount of their hearing while others lose a large amount—noise exposure being equal. Therefore, if a quick test could be developed that would show which individual would be the one to lose the largest amount of his hearing for a given exposure, this person could be protected or possibly excluded from the noise exposure. In a sense, the same problem is facing physicians who try to predict whether a particular 20-year old patient will have, solely as a result of the aging process, more or less than the average loss of hearing by the time he is 60 years old.

The Ear and Hearing Damage. The inner ear is filled with fluid and contains the nerve endings that eventually respond to the energy of the sound waves. This "response" to sound energy results in the sending of electrical impulses from the nerve endings up the eighth nerve to the brain. It is only after the brain interprets these electrical signals that "the ear hears."

Unfortunately, the damage to the hearing mechanism that results from noise exposure occurs in the inner ear. The small nerve endings that send electrical impulses to the brain are actually destroyed by the energy from the noise exposure. The nature of this destruction is apparently identical to the destruction of the nerve endings in the inner ear due to advancing age. So far, the medical scientists have been unable to distinguish between the hearing losses due to these two causes either before or after death.

Because the damage is in the inner ear, there is nothing that can be done to restore the hearing loss once it has occurred. Therefore, it is imperative that such losses be prevented. This should be completely understood by all who are concerned with the noise problem.

Measuring Noise and Hearing. The measurement of noise should determine the total sound energy present and the frequency distribution of the energy. In general, it takes eight octave bands to cover the frequency range from approximately 30 to 10,000 cycles per second (c. p. s.).

Pure tone audiometry is the technique being used by industry for testing auditory acuity. To test a subject with a pure tone audiometer, the environment must be quiet. The audiometer operator presents a pure tone, say 500 c. p. s. (approximately one octave above middle C on the piano), at an intensity such that the subject responds. The intensity of the tone is lowered until the subject just fails to hear. Threshold is defined as the sound-pressure level of the tone at which the subject hears only 50% of the

presentations. Such measurements are carried out at a number of frequencies. From an industrial point of view, the frequencies now used in the United States are 500, 1000, 2000, 3000, 4000, and 6000 c. p. s. The frequency of 8000 c. p. s. is sometimes used, and in some States, 250 c. p. s. is required. The zero or reference loss is taken as the hearing of a statistical group of individuals between the ages of 18 and 24 years. Normal hearing, or zero loss, implies hearing equal to the average hearing of 20-year old persons.

Summary. With an adequate hearing conservation program in operation, there is essentially no reason why a person should lose a significant amount of his hearing. By careful administration of audiometry and by the use of the presently known protective devices (ear plugs and muffs), a person's hearing may be protected. There is no "single shot" test by which industry can detect the susceptible individual whose hearing will be affected by noise exposure. However, these persons can be spotted before any significant loss of hearing for speech has occurred by using the procedure known as "repeat audiometry." By periodically sampling the hearing of noise exposed persons, change can be observed. It is evident that these changes occur first for frequencies above 2000 c. p. s.; hence the industrial need for measuring hearing losses at these frequencies. Shifts in hearing losses can thus be detected at high frequencies long before hearing losses become significant at 2000 c. p. s. and below. These persons can then be given further protection or shifted to a work area with less noise.

Not enough is known about intermittent exposures to either steady or impulse noise. Work still must be done in this area as well as in other areas associated with the problem. There is a lot to be learned about temporary loss of hearing and how it is related to permanent loss of hearing. Much remains to be done to fully acquaint industry with the problem and the necessity for taking effective steps against noise exposure. (Rudmose, W., Hazards of Noise Exposure: Noise Control, 4: 39-58, September 1958)

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